

Having an inventory and profile of your domestic (indoor) water use will help you understand how water is consumed in your office, building or facility. This, in turn, can help you identify the best points of attack to reduce water consumption, costs and environmental impact.

Outdoor water use, specifically irrigation, can also add greatly to your water consumption. The Green Business Challenge includes strategies for reducing outdoor water use. Refer to the Scorecard strategies for ways to further reduce your overall water consumption.

**Step 1:** Compile a baseline record of water consumption using your water utility bills. Understanding where you are starting from will help to highlight the potential for savings, the significance of those savings, and the compounded cost benefits over time. Use the data log tab in the Scorecard or Energy Star Portfolio Manager to compile gallons or Ccf and cost data.

The Energy Policy Act (EPA) 1992 established water efficiency standards (flow rates) for certain plumbing fixtures. The EPA 1992 is a national standard followed by all manufacturers and distributors of regulated plumbing fixtures in the US.

Toilets	1.6 gpf
Urinals	1 gpf
Showerheads	2.5 gpm @80 psi or 2.2 gpm @ 60 psi
Shower Faucets	2.5 gpm @80 psi or 2.2 gpm @ 60 psi
Kitchen Faucets	2.5 gpm @80 psi or 2.2 gpm @ 60 psi

- Preserve and protect water supply sources
- Ensure water availability for all beneficial uses
- Reduce water and energy costs
- Regulate and standardize plumbing fixture trade
- Protect health and the environment

The American Water works Association estimated nationwide savings of 6.5 billion gallons per day will be achieved by 2025 through these standards.

**Step 2:** Inventory all domestic water fixtures in your building, office, or facility, including all faucets, toilets and urinals. Record the flow rates of each fixture, either gallons per minute (gpm) or gallons per flush (gpf). The flow rates will typically be displayed on the rim of the faucet aerator (etched in the metal), printed on the seat of the toilet near the base of the tank, and on the top of the urinal. EPA guidelines for domestic flow rates for each are noted in the chart above. If you can not find a flow rate on the fixture itself, use these standards to estimate.

[illegible]

Log Water Data Here				
Start Date	End Date	CCF	Gallon/s	Cost
2/23/2010	3/30/2010	0.47	361.56	33.35
1/26/2010	2/23/2010	0.35	261.18	33.35
12/28/2009	1/26/2010	0.24	179.52	33.14
11/23/2009	12/28/2009	0.47	361.56	31.85
10/23/2009	11/23/2009	0.54	403.92	31.85
9/24/2009	10/23/2009	0.1	74.8	31.85
8/26/2009	9/24/2009	0.52	388.96	31.85
7/28/2009	8/26/2009	0.17	127.16	31.85
6/24/2009	7/28/2009	0.18	134.64	31.85
5/22/2009	6/24/2009	1.17	875.16	31.85
4/27/2009	5/22/2009	0.64	478.72	31.85
3/26/2009	4/27/2009	0.28	209.44	31.85
2/23/2009	3/26/2009	0.21	157.08	31.85
1/26/2009	2/23/2009	0.15	112.2	31.85

Water usage may be reflected in gallons or cubic feet. Charleston Water System (CWS) uses cubic feet and measures in hundreds of cubic feet, abbreviated as Ccf. Mt Pleasant Water Works measures in gallons.

**One Ccf equals 748 gallons of water.**

Go to: [www.charlestonwater.com/custserv\\_rates.htm](http://www.charlestonwater.com/custserv_rates.htm) for a description of CWS rate structure and billing.

Go to: [www.mountpleasantwaterworks.com](http://www.mountpleasantwaterworks.com) and click on Customer Service to view your rate plan and see an explanation of the rate schedule.

**Step 3:** Inventory all other water using appliances in your office, building, or facility (e.g. washing machine, dishwasher, ice maker, water fountain etc.). This will provide a more complete profile of indoor water use and help to identify additional opportunities for retrofits or upgrades to high efficiency, low flow or otherwise environmentally preferable models/fixtures.

**Good to know.**

*We are charged for water in several ways. We pay to have it delivered, we pay to heat (some of) it, and we pay to have it removed. Reducing water consumption through efficiency technologies and conservation practices will help reduce these costs associated with water consumption.*

**Step 4:** Estimate a baseline frequency and usage volume per day/week/month/year. (See “How To Calculate a Baseline” for an example).

**Step 5:** Calculate the savings potential for different retrofits. Use the same steps as you did to find your baseline usage, but substitute lower flow rates to project potential savings if you should choose to switch out standard faucet aerators for low flow versions, or decrease flush rate using displacement or a low flow toilet model, or replace urinals with low flow or waterless models. See examples to the right.

**Step 6:** Draw up a plan for changing out domestic fixture and/or retrofitting existing fixtures with low flow devices. Assess ability to replace water using appliance with low flow, high efficiency models. Brainstorm consumption practices and behaviors that could further reduce overall consumption.

Restroom Sink Water Use Comparison				
Weekly Use FTE	150			
Weekly Use Transient	5			
Flow Rate	2.5gpm	1.0 gpm	.5 gpm	.25 gpm
Duration of Use	15 sec.	15 sec.	15 sec.	15 sec.
	Gallons	Gallons	Gallons	Gallons
Weekly Water use	96.88	38.75	19.375	9.6875
Monthly Water use	387.52	155.00	77.50	38.75
Yearly Water Use	5,037.76	2,015.00	1,007.50	503.75

Toilet Water Use Comparison		
Weekly Use FTE	100	
Weekly Use Transient	2.5	
Flow Rate	1.6 gpf	1.28 gpf
Duration of Use	1 flush	1 flush
	Gallons	Gallons
Weekly Water use	164	131.20
Monthly Water use	656	524.80
Yearly Water Use	8,528	6,822.40

Urinal Water Use Comparison		
Weekly Use FTE	50	
Weekly Use Transient	2.5	
Flow Rate	1.0 gpf	0.0 gpf
Duration of Use	1 flush	1 flush
	Gallons Used/Saved	
Weekly	52.5	
Monthly	210	
Yearly	2,730	

#### How to calculate baseline:

- 1) Estimate FTE as well as transient users (visitors) of your office, building or facility. (This will vary greatly depending on business type. See "What is FTE" box below to calculate FTE for your business. Use your best judgment to estimate transient users.)
- 2) Note the flow rate for each domestic fixture type (i.e. toilets, urinals, and sinks).
- 3) Multiply FTE times the appropriate frequency of fixture use per day, times the flow rate of that fixture, times duration of use. This will give you total usage volume per day for the specified domestic use. (A common standard duration for lavatory sinks is 15-20 seconds. Duration for toilets and urinals should be recorded as 1 flush.)
- 4) Multiply daily use times number of work days in the week, the month and the year for perspective.
- 5) Your calculations thus far are probably in gallons. If useful, convert gallons to Ccf by dividing total gallons by 748 (1 Ccf = 748 Gallons).

#### Example:

Company A is an office business with 12 employees, 8 full time and 4 part-time. Therefore, FTE for Company A is 10, and we assume a 1:1 ratio of men to women. Company A has an estimated average 10 visitors per week of which half use the restroom facilities.

Here are the flow rates recorded for each fixture type at Company A:

All lavatory sinks	2.5gpm
All toilets	1.6gpf
All Urinals	1.0gpf

(\*If there are different flow rates for the same type fixture, use the average flow rate for your calculations.)

To calculate water consumption from sinks, multiply FTE by 3 (FTE use per day) by 2.5gpm (flow rate) by 15 seconds (duration). For weekly calculation, multiply this by number of work days in the week and add estimated transient domestic water use.

Baseline Restroom Sink Water Use	
Weekly Use FTE	<b>150</b> (10 FTE x 3 uses per day x 5 days a week)
Weekly Use Transient	<b>5</b>
Flow Rate	<b>2.5gpm</b>
Duration of Use	<b>15 sec.</b> (or .25 minutes)
Gallons	
Weekly water use	$(150 + 5)(.25 \times 2.5) = \mathbf{96.88}$
Monthly Water use	$4((150 + 5)(.25 \times 2.5)) = \mathbf{387.50}$
Yearly Water Use	$52((150 + 5)(.25 \times 2.5)) = \mathbf{20,150.00}$

To calculate water consumption from toilets, multiply men FTE by 1 and women FTE by 3 for total FTE use per day, by 1.6gpm (flow rate) times 1 (duration equals 1 flush).

Baseline Toilet Water Use	
Weekly Use FTE	<b>100</b> ((5 men FTE x 1 use per day + 5 women FTE x 3 use per day) x 5 days a week)
Weekly Use Transient	<b>2.5</b> (assume 1:1: ration for transient visitors)
Flow Rate	<b>1.6 gpf</b>
Duration of Use	<b>1 flush</b>
Gallons	
Weekly water use	$(100 + 2.5)(1.6 \times 1) = \mathbf{164}$
Monthly Water use	$4(100 + 2.5)(1.6 \times 1) = \mathbf{656}$
Yearly Water Use	$52(100 + 2.5)(1.6 \times 1) = \mathbf{8,528}$

To calculate water consumption from urinals, multiply men FTE by 2 (use per day) by 1.0gpf (flow rate) times 1 (duration equals 1 flush).

Baseline Urinal Water Use	
Weekly Use FTE	<b>50</b> ((5 men FTE x 2 use per day + 5 women FTE x 0 use per day) x 5 days a week)
Weekly Use Transient	<b>2.5</b> (assume 1:1: ration for transient visitors)
Flow Rate	<b>1.0 gpf</b>
Duration of Use	<b>1 flush</b>
Gallons	
Weekly water use	$(50 + 2.5)(1 \times 1) = \mathbf{52.5}$
Monthly Water use	$4(50 + 2.5)(1 \times 1) = \mathbf{210}$
Yearly Water Use	$52(50 + 2.5)(1 \times 1) = \mathbf{10,920}$

#### What is FTE?

FTE is full-time equivalency and used to calculate energy and water usage in audit assessments based on an eight hour work day. An 8-hour occupant has an FTE value of 1.0 while a part-time occupant has an FTE value based on their hours per day divided by 8.

\*In domestic water-use assessments, all FTE occupants are assumed to use bathroom facilities three times per 8 hour shift. Men are assumed to use a toilet once, a urinal twice and a sink three times per work day. Women are assumed to use a toilet three times and sink three times per work day. If you do not know the male to female ratio for your business use a 1:1 ratio.